

AIRLINE CUSTOMER SUPPORT SYSTEM

Multi-Intent Task Orchestration Platform

TEAM NAME: CodeTrio

PRESENTED BY,

21PW08 – JENISA MERLIN D, M. Sc SS

21PW09 – KADEEJA FARHA A P M, M. Sc SS

21PT19 – PRANATHI R, M. Sc TCS

PROBLEM STATEMENT 2

CHALLENGE

Airlines need intelligent, automated customer support that handles complex multi-step queries

KEY REQUIREMENTS

- Handles 5+ request types
- Multi-task orchestration per request type
- Real-time API integration
- Policy document querying
- Low Latency responses

SYSTEM ARCHITECTURE

3-Layer Intelligent Pipeline

Layer 1: Intent Classification

- BERT-based model for query understanding
- Generic vs Airlines-specific routing
- Prevents off-topic conversations

Layer 2: NLP-Driven Task Orchestration

- Keyword extraction for request categorization
- Context-aware information gathering

Layer 3: Multi-Source Data Integration

- Mock DB for passenger/booking data
- AviationStack API for real-time flight information
- Policy document retrieval system
- LLM-powered response synthesis

TECHNICAL STACK

FRONTEND:

- Streamlit UI

BACKEND:

- Python
- FastAPI
- SQLAlchemy
- SQLite

AI LAYER:

- spaCy (for entity extraction)
- LLM (for conversation & context)

External API:

- AviationStack (live flight updates)

INTENT DETECTION PIPELINE

Two-Stage Classification

Stage 1: Generic vs Airlines Filter

- Identifies off-topic queries
- Polite redirection to airline topics
- Ensures focused conversation

Stage 2: Request Type Classification

- Cancel Trip, Cancellation Policy, Flight Status, Seat Availability, Pet Travel Policy

NLP Techniques:

- Named Entity Recognition (flight numbers, PNR, dates)
- Keyword extraction
- Context retention across conversation

TASK ORCHESTRATION ENGINE

KEY FEATURES:

- Dynamic Task Execution based on Intent
- Error handling and retry logic
- Context persistence across tasks
- Information gathering from customer

Example: Flight Cancellation

- 1.Extract/Request PNR from customer
- 2.Call GET /flight/booking API
- 3.Present booking details for confirmation
- 4.Call POST /flight/cancel API
- 5.Format refund details via LLM
- 6.Deliver customer-friendly response

SCREENSHOTS

The screenshot shows a dark-themed chat interface. At the top right, a blue message bubble contains the text "I need to cancel my flight ticket". Below it, a dark blue message bubble from the bot says "Sure — please share the PNR of the booking you want to cancel.". A blue message bubble from the user contains the PNR number "PNR98765". The bot then responds with "I found booking PNR98765 for customer id 4 (Flight EK510). Do you want to cancel it? (yes/no)". A blue message bubble from the user contains the word "yes". Finally, a dark blue message bubble from the bot states "Booking with PNR PNR98765 has been cancelled. Seat 4D is now available. Refund initiated: ₹6300.00." At the bottom left, there's a text input field placeholder "Enter your message" with "e.g. What is the status of flight AI202?" and a "Send" button. At the bottom right, there are four buttons: "Check status", "Book a flight", "Cancel a ticket", and "Policies".

I need to cancel my flight ticket

Sure — please share the PNR of the booking you want to cancel.

PNR98765

I found booking PNR98765 for customer id 4 (Flight EK510). Do you want to cancel it? (yes/no)

yes

Booking with PNR PNR98765 has been cancelled. Seat 4D is now available. Refund initiated: ₹6300.00.

Enter your message

e.g. What is the status of flight AI202?

Send

Press Enter to submit form

Check status

Book a flight

Cancel a ticket

Policies

SCREENSHOTS

The image shows a dark-themed chat interface for a flight information bot. On the left, a sidebar displays the bot's name, "Trip Assistant", and its description, "Your Airline AI ChatBot". A "Clear chat" button is also present. The main area is titled "Trip Assistant" and contains five blue input bubbles with white text, each followed by a dark blue response bubble.

- User: what is the status of the flight SQ950
- Bot: Flight SQ950 (Singapore Airlines) is currently *scheduled*. It is flying from Singapore Changi to Soekarno-Hatta International.
- User: what is the terminal for flight SQ950
- Bot: Flight SQ950 is scheduled to arrive at terminal 3.
- User: what is the gate for flight SQ950
- Bot: Flight SQ950 is scheduled to depart from gate F42.
- User: what could be the expected arrival time for flight SQ950
- Bot: The estimated arrival time for SQ950 is 2025-10-23T07:01:00+00:00.

SCREENSHOTS

The image shows a screenshot of a mobile application interface for "Trip Assistant", described as "Your Airline AI ChatBot". The background is dark, and the app's logo is at the top left. On the left side, there is a vertical navigation bar with a "Clear chat" button.

Interaction 1: A blue message bubble contains the question "what is the baggage policy for flight A202?". Below it, a dark blue response bubble says: "Here is the policy I found: Air India: Economy standard: 1 checked bag up to 15kg (domestic) or 23kg (international, varies by route), 1 cabin bag up to 7kg. Dimensions apply."

Interaction 2: A blue message bubble contains the question "for flight EK510, what is the cancel policy". Below it, a dark blue response bubble says: "Here is the policy I found: Emirates: Fees and refund eligibility depend heavily on fare type (Saver, Flex, Flex Plus). Check specific ticket conditions."

Interaction 3: A blue message bubble contains the question "pets policy for flight UA321". Below it, a dark blue response bubble says: "Here is the policy I found: United: Small dogs/cats in cabin (fee applies, space limited, book early). Carrier under seat. No pets in Polaris/First int'l. Check specific flight/destination rules."

RESULTS

- 5 request types fully implemented
- <500ms average response time
- 95%+ intent classification accuracy
- Seamless multi-task orchestration

FUTURE ENHANCEMENTS

- Integration with more airline API's
- Proactive notifications
- Multi-language support
- Voice interface integration
- Industry Expansion

DEMO

THANK YOU